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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,332	07/22/2003	David R. Hembree	3592.8US (97-0321.08/US)	6977
24247	7590	08/07/2006	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			LEE, CHEUNG	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 08/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/624,332	HEMBREE, DAVID R.	
	Examiner	Art Unit	
	Cheung Lee	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Notice to Applicant

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 19, 2006 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desai et al. (U.S. Patent 6,166,434; hereinafter "Desai") in view of Kim et al. (US Pat. 5552635; hereinafter "Kim"), and further in view of Toy et al. (U.S. Patent 6,451,155; hereinafter "Toy").
3. Referring to figures 2A-2F and related text, Desai discloses [Re claims 1, 3 and 5] a method for assembling a Chip On Board semiconductor device on a substrate 206, said Chip On Board semiconductor device (see fig. 2F) having a semiconductor die 200 and a heat sink cap 210 abutting a portion of a top surface of a substrate (see fig. 2D;

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col. 6, lines 43-59) including: providing an adhesive between a portion of an upper surface 203 of the semiconductor die and a portion of a lower surface of the heat sink cap (col. 6, lines 43-59) for engaging the semiconductor die and heat sink cap (col. 5, lines 60-67) for abutting the edge of the heat sink cap to the substrate (col. 6, lines 43-59); and placing an encapsulant 208 into the heat sink cap for engaging interior portions of the heat sink cap, portions of the semiconductor die, portions of the top surface of the substrate and portions of the adhesive (see fig. 2E; col. 6, line 60-col. 7, line 10). Desai discloses the two sides 214 and 216 of the clip in figure 2B closely engage two edges of the die when the clip is placed over the die (col. 5, lines 60-67). So, the encapsulant engages portions of the adhesive when an underfill material is dispensed into the gap 207 since there is a space between the clip and the die. But Desai fails to disclose expressly an adhesive, which is a compliant adhesive-filled gel silicone elastomer, and the heat sink cap, which surrounds the semiconductor die with at least one hole therein.

Toy discloses a silicon-containing polymeric adhesive (e.g., a silicone elastomeric material) being used to attach a heat sink to the multi-chip module (col. 4, lines 26-40). The examiner interprets that the silicon-containing polymeric adhesive is compliant since the flexibility of the elastomer can be adjusted by manipulating the relative amount of filler (col. 9, line 49-col. 10, line 6). Besides, the steps of engaging the semiconductor die and the heat sink cap in compliant removable adhesion is achieved before the adhesive is fully cured. And it is obvious to apply any form of pressure to the semiconductor die into the cap to engage the semiconductor die and the cap.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the adhesive silicone elastomer film as an adhesive between the clip and the semiconductor die. The motivation for doing so would have been to achieve a remarkable heat resistance.

Referring to figures 6-9 and related text, Kim discloses a metal cap 109, which encases a semiconductor chip 104, having a hole 106 (see fig. 9).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the metal cap that surrounds the semiconductor die, as taught by Kim, because it would have been to achieve a remarkable protection of all sides of the semiconductor die while dissipating heat.

4. [Re claims 2, 4 and 6] The combined teaching of Desai, Toy and Kim discloses a method for assembling a Chip On Board semiconductor device on a substrate as set forth in claims 1, 3, and 5, Toy discloses wherein the compliant adhesive-filled gel silicone elastomer includes a cross-linked silicone (col. 9, lines 27-48).

Response to Arguments

5. Applicant's arguments filed on April 26, 2006 with regard to the rejection under 35 U.S.C. 103(a) have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

6. With respect to claims 1, 3 and 5, applicant argued that no suggestion or motivation can be found for combining the teachings of Desai, Kim and Toy. However, the motivation for combining the references were given in the rejection, for example, the

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motivation for combining Desai with Toy would have been to achieve a remarkable heat resistance, and the motivation for combining Desai with Kim would have been to achieve a remarkable protection of all sides of the semiconductor die while dissipating heat. Note that the test of obviousness under 35 USC 103 does not require an expressed suggestion of the claimed invention in the prior art. All that is required to show obviousness is that the claimed invention would have been made obvious by applying knowledge clearly present in the prior art. *In re Rosselet*, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); *In re Sheckler*, 438 F.2d 999, 168 USPQ 716 (CCPA 1971); *In re Sovish*, 769 F.2d 738, 226 USPQ 771 (Fed. Cir. 1985). The expectation of some advantage is the strongest rationale for combining references (MPEP 2144).

7. Applicant argued that the inclusion of a hole in the Desai's die clip would act as a vent to allow any underfill material being injected into the gap to escape therefrom preventing the Desai's die clip from filling with the underfill material. However, Kim discloses wherein the hole should be sealed to prevent any leaks (col. 6, lines 27-45). Besides the underfill material has to be completely filled the gap before escaping to the hole.

8. Applicant also argued that in contrast to the claimed inventions of presently amended independent claims 1, 3 and 5, the combined teachings of Desai, Kim and Toy merely teach or suggest a die clip filled with mineral oil wherein the semiconductor die is spaced from the cap having no contact therewith. However, the claimed limitation does not include that semiconductor die has to be in contact with the cap. Also, note that applicant's argument is largely directed to what the cited reference teaches

individually. However, it is axiomatic that one cannot show nonobviousness by attacking references individually where the rejection, as here, is based on a combination of references. *In re Young*, 403 F.2d 754, 159 USPQ 725 (CCPA 1968); *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). For example, applicant argues that Kim does not disclose a cap placed on the semiconductor die with an adhesive in between. However, Desai, not Kim, is employed in the rejection to show that feature of the claimed process. Besides the Desai's die clip can meet the claimed limitation in broader interpretation wherein the die clip surrounds the semiconductor die with an opening, but the examiner shows that Kim's cap can be used too. Therefore, all the limitations of claims 1, 3 and 5 are met.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheung Lee whose telephone number is 571-272-5977. The examiner can normally be reached on Monday through Friday from 8:30AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Cheung Lee

August 1, 2006



MICHAEL LEBENTRITT
SUPERVISORY PATENT EXAMINER